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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

CHANEY, CAROL DIANE

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 09/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/987,939

Applicant(s)

PARK ET AL.

Examiner

Carol Chaney

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 November 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-10 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_                      6) ☐ Other: \_\_\_\_\_

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1, 5, and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Takada et al., US Patent 5,498,405.

Takada et al. disclose anodes for lithium batteries. An exemplary embodiment includes an anode having a current collector coated with a Si-Fe alloy, which is a silicon layer. The anode is then coated with a lithium-silver-tellurium alloy. Thus, the alloy includes a silicon-containing layer and a silver-containing layer. The silver containing layer is coated over the iron-silicon layer, and therefore is the topmost layer. (See

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column 9, line 56-column 10, line 8.) Note that the anode will contain separate silicon-containing and silver-containing layers at least initially.

Claims 1, 5 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Kawakami et al., US Patent 6,051,340.

Kawakami et al. disclose multi-layered anodes for lithium batteries. The configuration illustrated in Figure 4(g) includes a bottom layer 107 which is an electrically conductive layer. (See column 10, lines 41-42.) This layer may be a metal or metal alloy such as Sn, Sn-Be, Sn-Pb, Zn-Al or Cu-Zn. (See column 14, lines 61-63.) Because this layer is conductive metal, it will function as a current collector. Layer 101 is formed on top of layer 107 and is a metal "incapable of being alloyed with lithium". (See column 9, lines 39-41 and column 11, lines 8-17.) Although layer 101 is referred to as a current collector in the Kawakami patent, both layers 107 and 101 conduct electrons and function as current collectors. Silver is a suggested material for layer 101. See column 13, lines 40-42.) A layer 102 is formed on top of layer 101 and is a material capable of being alloyed with lithium. (see column 9, lines 37-38.) silicon is a suggested material for this layer. (See column 13, lines 36-38.) Thus, an embodiment of the Kawakami et al. invention includes layers of silver and silicon alternately stacked.

With regards to claim 6, Kawakami et al. suggest the battery can be formed as a stacked structure. (Column 10, lines 15-18.) A stacked anode structures of the type shown in Figure 4(g) will contain a silver layer between silicon layers.

Claims 8-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Idota et al., US Patent 6,234,437.

Idota et al. disclose anodes for lithium secondary batteries. In a specific embodiment, a silicon silver alloy is used as an anode active material. The alloy particles are coated with a combination of SiO<sub>2</sub> and Ni. The coated particles are mixed with carbon and binder and applied to a current collector. (See column 31, lines 38-67.) The paste layer is considered a "single-layer thin film". With regards to claim 9, the atomic ratio of silicon to silver in alloy III-2 disclosed by Kawakami et al. is 60:40. With regards to claim 10, the nickel plating on the alloy particles is a buffer layer between the alloy particles and the current collector.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al.

Kawakami et al. disclose applicants' invention essentially as claimed, with the exception that Kawakami et al. do not disclose specific metal layer thicknesses for their

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inventive anodes. However, the thickness of the anode layer is considered a result-effective variable, which would have been obvious to one of ordinary skill in the art to adjust layer thicknesses according to requirements for mechanical strength and/or capacity of the battery. The discovery of optimum of result effective variable in known process is ordinarily within the skill of the artisan. See, for example, *In re Boesch*, 205 USPQ 215 (CCPA 1980).

### ***Allowable Subject Matter***

Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art does not suggest anode for a lithium battery having multiple layers comprising silver and silicon, with a buffer layer of Ni, V, Mo, or Cu between the current collector and the first active material layer. The nearest prior art of Kawakami et al. suggests lithium battery anodes with silver layers and silicon layers, but fail to suggest a buffer layer of Ni, V, Mo, or Cu between the current collector and the layers. The prior art provides no motivation for adding such a layer.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol Chaney whose telephone number is (703) 305-3777. The examiner can normally be reached on Mon - Fri 8:00am-4:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 703-308-2383. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Carol Chaney  
Primary Examiner  
Art Unit 1745

cc